

DETAILED ACTION

Response to Arguments

Applicant's arguments, filed 03/11/2008, with respect to claims 1-4, 6-8, 10, 32, 34-37, 39 and 40 have been fully considered and are persuasive. The rejections of claims 1-4, 6-8, 10, 32, 34-37, 39 and 40 has been withdrawn.

Applicant's arguments with respect to claim s 1-4, 6-8, 10, 32, 34-37, 39 and 40 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 9-12 and 32- 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Uchida [US 6,870,284].

Claim 1, Uchida discloses an actuator [figure 1] for operating upon a load having a load characteristic over a stroke length, including a field assembly [20] comprising a first plurality of magnets [1a-1d] configured to provide flux density distributions [figure 2] in an air gap [figure 1] selected over the stroke length to substantially match the load

characteristic over the stroke length [resulting in small thrust ripple and high accuracy, col. 1 lines 41-51]; and a coil assembly [2, 2b]. It has been held that the recitation that the element is “configured to” perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchinson, 69 USPQ 1338.

Claim 2, Uchida discloses the actuator of claim 1, wherein dimensions of the first plurality of magnets are selected to provide the selected flux density distributions in the air gap [col. 3 lines 17-26 and col. 4 lines 4-10].

Claim 3, Uchida discloses the actuator of claim 2, wherein the first plurality of magnets are aligned in alternating groups [group 1 made of magnets 1a and 1b while group two is made of magnets 1c and 1d], so that magnets in one of the alternating groups have a first polarity, and magnets in an adjacent alternating group have a second polarity opposite to the first polarity [figure 1].

Claim 4, Uchida discloses the actuator of claim 2, wherein the first plurality of magnets are positioned in a first set of aligned groups on a field blank [7], and at least one of the aligned groups of the first set of aligned groups includes a pair of magnets having the same polarity [figure 1].

Claim 5, Uchida discloses the actuator of claim 2, wherein the load characteristic corresponds to a spring having a spring constant K and the first plurality of magnets is configured to provide the flux density [figure 2] distributions in the air gap over the stroke length to vary in correspondence to the spring constant K over the stroke length. It has been held that the recitation that the element is “configured to” perform a function

is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchinson, 69 USPQ 1338.

Claim 9, Uchida discloses the actuator of claim 1, wherein the actuator has a frictional component [any load on an actuator will have a frictional component] over the stroke length, and further wherein the first plurality of magnets is further configured to provide a flux density distribution [figure 2] in the air to substantially match the frictional of the actuator over the stroke length. It has been held that the recitation that the element is “configured to” perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchinson, 69 USPQ 1338.

Claim 10, Uchida discloses a linear actuator for operating upon a load having a load characteristic over a stroke length, including a field assembly [10] comprising distributed magnet field sources [1a-1d] which provide a flux density distribution [figure 2] in an air gap [figure 1] over the stroke length corresponding to the load characteristic over the stroke length [resulting in small thrust ripple an high accuracy, col. 1 lines 41-51; and a coil assembly [2a, 2b].

Claim 11, Uchida discloses the linear actuator of claim 10, wherein a frictional component [any load on an actuator will have a frictional component] is present over the stroke length, and further wherein the distributed magnet field sources are further configured to provide the flux density distribution [figure 2] in the air gap to compensate for the frictional component over the stroke length. It has been held that the recitation that the element is “configured to” perform a function is not a positive limitation but only

requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchinson, 69 USPQ 1338.

Claim 12, Uchida discloses the linear actuator of claim 11, wherein the frictional component corresponds to friction characteristics of the load [part of the friction on the actuator is due to the load].

Claims 32- 40, the method steps of configuring a linear actuator would have been necessitated by the product structure as described for claims 1-5 and 9-12 previously.

Claims 1, 2, 4, 6-8, 19, 20, 28 and 32-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Nagai et al. [US 6,043,572].

Claim 1, Nagai et al. discloses an actuator [figure 1] for operating upon a load having a load characteristic over a stroke length, including a field assembly comprising a first plurality of magnets [10a-10d and 12a-12b] configured to provide flux density distributions [figure 3] in an air gap [figure 1] selected over the stroke length to substantially match the load characteristic over the stroke length [resulting in small thrust ripple and high driving force, col. 1 lines 37-47]; and a coil assembly [16]. It has been held that the recitation that the element is “configured to” perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchinson, 69 USPQ 1338.

Claim 2, Nagai et al. discloses the actuator of claim 1, wherein dimensions of the first plurality of magnets are selected to provide the selected flux density distributions in the air gap [col. 4 line 56 to col. 5 line 5].

Claim 4, Nagai et al. discloses the actuator of claim 2, wherein the first plurality of magnets [10a-10d and 12a-12b] are positioned in a first set of aligned groups on a field blank [14], and at least one of the aligned groups of the first set of aligned groups includes a pair of magnets having the same polarity [such as 10a and 12a or 10b and 12b, figure 1].

Claim 6, Nagai et al. discloses the actuator of claim 1, wherein the field assembly includes a first field blank [14] positioned to face a second field blank [15], the first and second field blanks each comprising a planar portion and additional sections which provide flux paths perpendicular to a direction of motion of the coil assembly, and further wherein the first plurality of magnets [10a-10d and 12a-12b] are positioned along the direction of motion on the planar portion of the first field blank [figure 1].

Claim 7, Nagai et al. discloses the actuator of claim 6, wherein the first plurality of magnets are arranged in a first pattern of polarities [figure 1], and further including a second plurality of magnets [11a-aad and 13a-13b] positioned on the planar portion of the second field blank [15] to oppose the first plurality of magnets [figure 1], and further wherein the second plurality of magnets are arranged in a second pattern of polarities which is a complement of the first pattern of polarities [figure 1].

Claim 8, Nagai et al. discloses the actuator of claim 4, further including a second set of aligned groups of magnets [11a-11d and 13a-13b] positioned on an opposing field blank [15], wherein the first set of aligned groups are arranged in a first pattern of polarities [figure 1], and further wherein the second set of aligned groups of magnets are arranged in a second pattern of polarities [figure 1] which is a complement of the first pattern of polarities [figure 1].

Claim 19, Nagai et al. discloses a linear actuator [figure 1] including a field assembly comprising a first field blank [14], a first plurality of magnets [10a 12a] of one polarity followed by a second plurality of magnets [10b 12b] of a different polarity positioned on the first field blank [14] in a direction of motion of the linear actuator, and a coil assembly [16] including a generally planar coil comprising a first force generating portion spaced apart from a second force generating portion so that the first force generating portion is positioned over ones of the first plurality of magnets whenever the second force generating portion is positioned over ones of the second plurality of magnets [figure 1].

Claim 20, Nagai et al. discloses the linear actuator of claim 19, wherein the first and second pluralities of magnets are arranged in a first pattern of polarities [figure 1], and further including a third [11a 13a] and fourth [11b 13b] pluralities of magnets positioned on a planar portion of a second field blank [15] to oppose the first plurality of magnets and to form a gap [figure 1], and further wherein the third and fourth plurality of magnets are arranged in a second pattern of polarities which is a complement of the first pattern of polarities [figure 1], and the generally planar coil is moveable along the gap [figure 1].

Claim 28, Nagai et al. discloses a linear actuator operational in a direction of motion including a plurality of field sub-assemblies each comprising a field blank [14/15], wherein a first one of the plurality of field sub-assemblies includes consecutive groups of magnets [10a-10d and 12a-12b / 11a-11d and 13a-13b], each one of the consecutive groups of magnets including a plurality of magnets arranged to have a selected magnetic polarity and to produce a selected magnetic flux density distribution

[figure 3] in an air gap [figure 1], and further wherein the first one of the plurality of field sub-assemblies is positioned with respect to a second one of the plurality of field sub-assemblies to form the air gap between them [figure 1]; and a coil assembly [16] including at least one coil positioned in a plane within the air gap, wherein the plane is substantially parallel to the direction of motion of the linear coil actuator [figure 1].

Claims 32- 40, the method steps of configuring a linear actuator would have been necessitated by the product structure as described for claims 1, 2, 4, 6-8, 19, 20 and 28 previously.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchida [US 6,870,284].

Claim 14, Uchida discloses a linear actuator for operating upon a load having a load characteristic over a stroke length, including a field assembly [10] comprising a magnet structure which includes a plurality of magnets [1a-1d] arranged in a sequence so that one of the plurality of magnets [1a] having a first polarity are followed by at least another of the plurality of magnets [1b] having a polarity different from the first polarity, and flux distributions [figure 2] in an air gap over the stroke length provided by the

sequence correspond to the load characteristic over the stroke length [resulting in small thrust ripple and high accuracy, col. 1 lines 41-51]; and a coil assembly [2a, 2b]. It has been held that the recitation that the element is “configured to” perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchinson*, 69 USPQ 1338.

Uchida fails to teach a plurality of magnets [1a-1d] arranged in a sequence so that at least two adjacent ones of the plurality of magnets have a first polarity. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make one larger magnet into two smaller magnets, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179.

Claim 15, Uchida discloses the linear actuator of claim 14, wherein a frictional component [any load on an actuator will have a frictional component] is present over the stroke length, and further wherein the sequence of magnets is further configured to provide a flux density distribution [figure 2] in the air gap to compensate for the frictional component over the stroke length. It has been held that the recitation that the element is “configured to” perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchinson*, 69 USPQ 1338.

Claim 16, Uchida discloses the linear actuator of claim 15, wherein the frictional component corresponds to friction characteristics of the linear actuator [part of the friction on the actuator is due to the load].

Claim 17, Uchida discloses the linear actuator of claim 14, wherein the load characteristic corresponds to a spring having a spring constant K and the sequence of the plurality of magnets provide the flux density distributions [figure 2] in the air gap over the stroke length in correspondence to the spring constant K over the stroke length.

Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai et al. [US 6,043,572].

Claim 24, Nagai et al. discloses a linear actuator operational in a direction of motion including a plurality of field sub-assemblies each comprising a field blank [14/15], and wherein at least one of the plurality of field sub-assemblies includes a first magnet of one polarity [10a/11a] followed in the direction of motion by a second magnet [10b/11b] of a different polarity, wherein the plurality of field sub-assemblies are positioned with respect to one another to form a gap between [figure 1] the at least one of the plurality of field assemblies which includes the sequences of magnets, and another of the plurality of field assemblies [figure 1]; and a coil assembly [16] including coils positioned within the gap in a plane substantially parallel to the direction of motion [figure 1].

Nagai et al. fails to teach a first sequence of magnets of one polarity followed in the direction of motion by a second sequence of magnets of a different polarity. It would have been obvious to one having ordinary skill in the art at the time the invention was made to divide a magnet [10a/11a] into several smaller magnets of strength equal to the larger magnet, since it has been held that constructing a formerly integral structure in

various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179.

Claims 25-27, Nagai et al. discloses the claimed invention except for the widths of the resulting plurality of magnets. It would have been obvious to one of ordinary skill in the art at the time the invention was made to change the number and widths of the magnets as long as the resulting plurality of magnets has a magnetic field equal to the original magnet being divided, since applicant has not disclosed that the specific widths solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with any size magnets as the resulting plurality of magnets has a magnetic field equal to the original magnet being divided.

Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchida [US 6,870,284] in view of Ishiyama [US 6,040,642].

Claims 13 and 18, Uchida discloses the claimed linear actuator with the exception of the magnets being selected so that the flux density distribution in the air gap changes in a direction of motion of the linear actuator.

Ishiyama teaches a linear actuator wherein the magnets are selected so that the flux density distribution in the air gap decreases in a direction of motion of the linear actuator [figure 8].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to alter the field strengths of the magnets used in the linear actuator as taught by Ishiyama in order to change the linear actuators response characteristics depending on the expected load.

Allowable Subject Matter

Claims 21-23 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The indicated allowability of claims 24-30 is withdrawn in view of the newly discovered reference(s) to Uchida [US 6,870,284] and Nagai et al. [US 6,043,572]. Rejections based on the newly cited reference(s) follow.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BERNARD ROJAS whose telephone number is (571)272-1998. The examiner can normally be reached on M and W-F, 5:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin G. Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Application/Control Number: 10/690,340
Art Unit: 2832

Page 13

/Elvin G Enad/
Supervisory Patent Examiner, Art Unit 2832

Br
/Bernard Rojas/
Examiner, Art Unit 2832